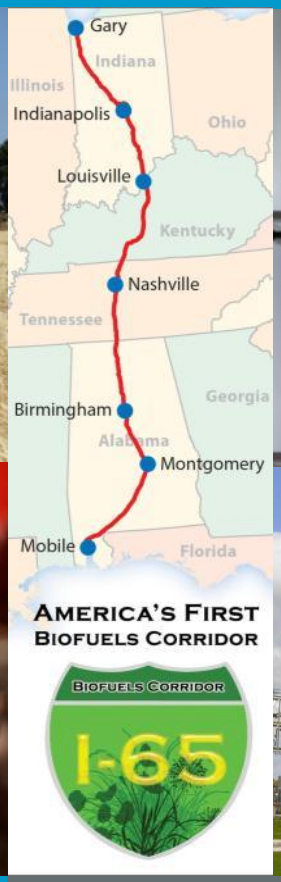


Biomass R&D Technical Advisory Committee

June 4-6, 2013

Elliott Levine

Committee Business for 2013

Welcome to New Members

- New Co-Chair: Dr. Kevin Kephart, Vice President for Research, South Dakota State University
- Dr. Paul Bryan, Lecturer, Department of Chemical and Biomolecular Engineering, University of California, Berkeley
- Steve Csonka, Executive Director, Commercial Aviation Alternative Fuels Initiative, DBA Csonka Aviation Consultancy, LLC
- Claus Crone Fuglsang, Vice President, Bioenergy R&D, Novozymes North America, Inc.
- Dr. Man Kit Lau, Senior Scientist, BioAmber, Inc.
- Dr. Johannes Lehmann, Distinguished Professor, Dept. of Crops and Soil Sciences, Cornell University
- Christine McKiernan, Vice President of Engineering, BIOFerm Energy Systems
- Dr. Ray Miller, Director and Professor, Forest Biomass Innovation Center, Michigan State University
- Dr. Don Stevens, President, Cascade Science and Technology Research

TAC Housekeeping

Travel Process

- Natalie Roberts is the point of contact for all questions related to TAC travel and reimbursement. She can be reached at natalie.roberts@ee.doe.gov or 202-586-2325.
- Reimbursement deadline for the June meeting: **July 15th**

Future Meeting Dates

- Tentative meeting dates for 2013 Q3 and Q4 meetings have been identified below and will be discussed during the meeting:
  - Q3: August 12-16, 2013
  - Q4: November 18-22, 2013

Binder

Contents

1. Biomass R&D Technical Advisory Committee Meeting Agenda
2. Biomass R&D Act (as amended)
3. Biomass R&D Technical Advisory Committee Charter
4. Biomass R&D Technical Advisory Committee Members
5. Biomass R&D Board Members
6. Speaker Bios
7. 2012 TAC Recommendations
8. 2013 TAC Meeting Dates
9. DOE and USDA Biomass Updates
10. Biomass R&D Board Agencies Information Request

Agenda at a Glance - Day 1

Wednesday, June 5th

Introduction and Welcome

- *7:30 am – 8:00 am: Breakfast (to be provided for Committee)*
- 8:00 am – 8:30 am: SGE Ethics Training for New Members – *Melinda Comfort (DOE)*
- 8:30 am – 8:40 am: Introduction and Welcome to New Members – *Co-Chairs*
- 8:40 am – 9:00 am: Committee Overview – *Elliott Levine, Committee DFO*

DOE/USDA Updates

- 9:00 am – 9:20 am: DOE Updates – *Elliott Levine (DOE)*
- 9:20 am – 9:40 am: USDA Updates – *Todd Campbell (USDA)*
- *9:40 am – 10:00 am: Break*

Biomass R&D Board Updates

- 10:00 am – 10:10 am: Presentation from the Operations Committee – *Todd Campbell (USDA)*
- 10:10 am – 11:00 am: Discussion: Implementing Guidance from the Board – *Co-Chairs and TAC*

Presentations

- 11:00 am – 11:15 am: Overview of DOE Grand Challenge Process
- 11:15 am – 12:00 pm: DOE IBR Portfolio – Lessons Learned – *Brian Duff (DOE)*
- *12:00 pm – 1:00 pm: Lunch*
- 1:00 pm – 2:15 pm: Florida Center for Renewable Chemicals and Fuels – *Lonnie Ingram (UF)*
- 2:15 pm – 2:45 pm: A Review of the Recent Pilot Scale Demonstration and its Implication on Commercial Scale Economics – *Adam Bratis (NREL)*

Breakouts

- 2:45 pm – 3:00 pm: Public Comment
- 3:00 pm – 5:45 pm: Subcommittee Breakouts

Agenda at a Glance - Day 2

Thursday, June 6th

- *8:00 am – 8:30 am: Breakfast*

2013 Committee Work and Subcommittee Objectives

- 8:30 am – 10:00 am: Subcommittee Breakouts
- *10:00 am – 10:15 am: Break*
- 10:15 am – 11:30 am: Subcommittee Report Outs
- 11:30 am – 11:45 am: Public Comment
- 11:45 am – 12:00 pm: Closing Comments and Next Steps – Co-Chairs

Site Visits

- *12:00 pm – 2:00 pm: Retrieve Box Lunch and Travel to Citra, Florida*
- 2:00 pm – 3:30 pm: Tour Plant Science Research and Education Unit
- *3:30 pm – 4:00 pm: Travel to Gainesville, Florida*
- 4:00 pm – 5:30 pm: Tour Planet Green Solutions
- *5:30 pm – 8:30 pm: Travel back to Orlando*

TAC Q2 Meeting – About the Facilities

INEOS BioEnergy Center, Vero Beach, FL

The first commercial scale facility employing a unique combination of gasification and fermentation processes, using vegetative, yard, and municipal solid waste as feedstock. This unique “feedstock flexible” process has been in development for over 20 years with seven years of pilot plant testing.

Plant Science Research and Education Unit (PSREU), Citra, FL

The University of Florida/Institute of Food and Agricultural Sciences (UF/IFAS). The Plant Science Research and Education Unit serves more than 140 UF/IFAS faculty and researchers from throughout the state. UF/IFAS is collaborating with other organizations in conducting over 400 projects including weather and climate studies, crop water management plant pathology, corn genomics, cover radar density studies, and many other topics at the PSREU.

Planet Green Solutions

Planet Green Solutions focuses on development of thermo-chemical reactor technology. Their extensive research and development effort has resulted in a state-of-the-art 21st century thermo-chemical biomass reactor and power generation system. Their systems can mix and match both electrical power and heat generation capabilities along with a number of feedstock preparation and material handling options.

Biomass R&D Act

- The Committee was established by the Biomass Research and Development Act of 2000 (Biomass Act). This has since been amended by the Food, Conservation and Energy Act of 2008 (FCEA). The revised Biomass R&D Act outlines the Committee's objectives, membership requirements, and duties.

- The Biomass R&D Act also established the Interagency Biomass R&D Board and the Biomass R&D Initiative.

Update on 2013 Funding

Biomass R&D Act was extended through 2013 under House Resolution 8, the American Taxpayer Relief Act of 2012.

- While the legislation authorizing the TAC was extended by Congress, no Mandatory funding was set aside for BRDI, which leaves the annual solicitation, as well as some of the TAC responsibilities, on hold.
- Implications of HR 8?

Quoted below from the Biomass Research and Development Act:

(g) Reports.--For each fiscal year for which funds are made available to carry out this section, the Secretary of Energy and the Secretary of Agriculture shall jointly submit to Congress a detailed report….

(h) Funding.--

- (1) Mandatory funding.--Of the funds of the Commodity Credit Corporation, the Secretary of Agriculture shall use to carry out this section, to remain available until expended–
  - (A) $20,000,000 for fiscal year 2009;
  - (B) $28,000,000 for fiscal year 2010;
  - (C) $30,000,000 for fiscal year 2011; and
  - (D) $40,000,000 for fiscal year 2012.

New Technical Advisory Committee Charter

- The TAC renewed its Committee Charter on May 13, 2013.
  - New Charter is valid for two years, and is renewed biennially.

- No major changes were made to the Charter.
  - Detailing section 9008(6)(h) of the Farm Security and Rural Investment Act of 2002, the following was updated to address the funding allowed for the Biomass R&D initiative:

    $20,000,000 for fiscal year 2009

    $28,000,000 for fiscal year 2010

    $30,000,000 for fiscal year 2011

    $40,000,000 for fiscal year 2012

    Fiscal year 2013 funding is pending resolution and expected in the upcoming Farm Security and Rural Investment Act.

Please see your binder for a copy of the revised Charter.

TAC Functions

Official functions of the Biomass R&D TAC include:

- Advise the Secretary of Energy, the Secretary of Agriculture, and their points of contact concerning:
  - The technical focus and direction of requests for proposals issued under the Initiative
  - Procedures for reviewing and evaluating the proposals.

- Facilitate consultations and partnerships among federal and state agencies, agricultural producers, industry, consumers, the research community, and other interested groups to carry out program activities relating to the Initiative.

- Evaluate and perform strategic planning on program activities relating to the Initiative.

**Please note that TAC members should not respond to media requests, or speak on behalf of the Committee. The Committee Co-chairs are the designated points of contact for the TAC.

Committee Business

Meeting Goals

- Q2: First Draft of TAC Recommendations
  - Following discussion of unmet needs and the R&D needed to achieve them.
- Q3: Finalize TAC Recommendations
- Q4: Vote on TAC Recommendations

TAC Resources

- TAC Library and BRDI Spreadsheet
- Outside experts and panel discussions with government officials, industry executives, and scientists.
- One off-site field trip (outside of Washington) per year.
- Follow-up with other information requests related to the BRDI and other DOE/USDA funding initiatives.

TAC Recommendations

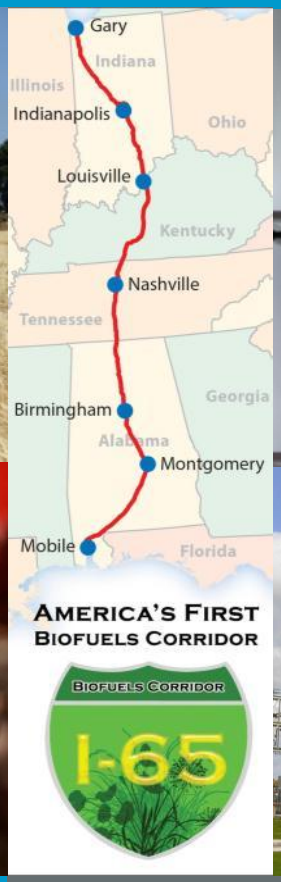
The TAC is explicitly charged with recommendations to ensure:

- Funds authorized for the Initiative are distributed and used in a manner that is consistent with the objectives, purposes, and considerations of the Initiative
- Solicitations are open and competitive with awards made annually
- Objectives and evaluation criteria of the solicitations are clearly stated and minimally prescriptive, with no areas of special interest
- Funding proposals are selected on the basis of merit, as determined by an independent panel of scientific and technical peers predominantly from outside the Departments of Agriculture and Energy.

Although the Charter calls for the TAC to make recommendations related specifically to the BRD Initiative, DOE and USDA General Counsel have advised that a broader biomass R&D scope is permissible.

BIOENERGY TECHNOLOGIES OFFICE

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy



Biomass R&D Technical Advisory Committee

June 4-6, 2013

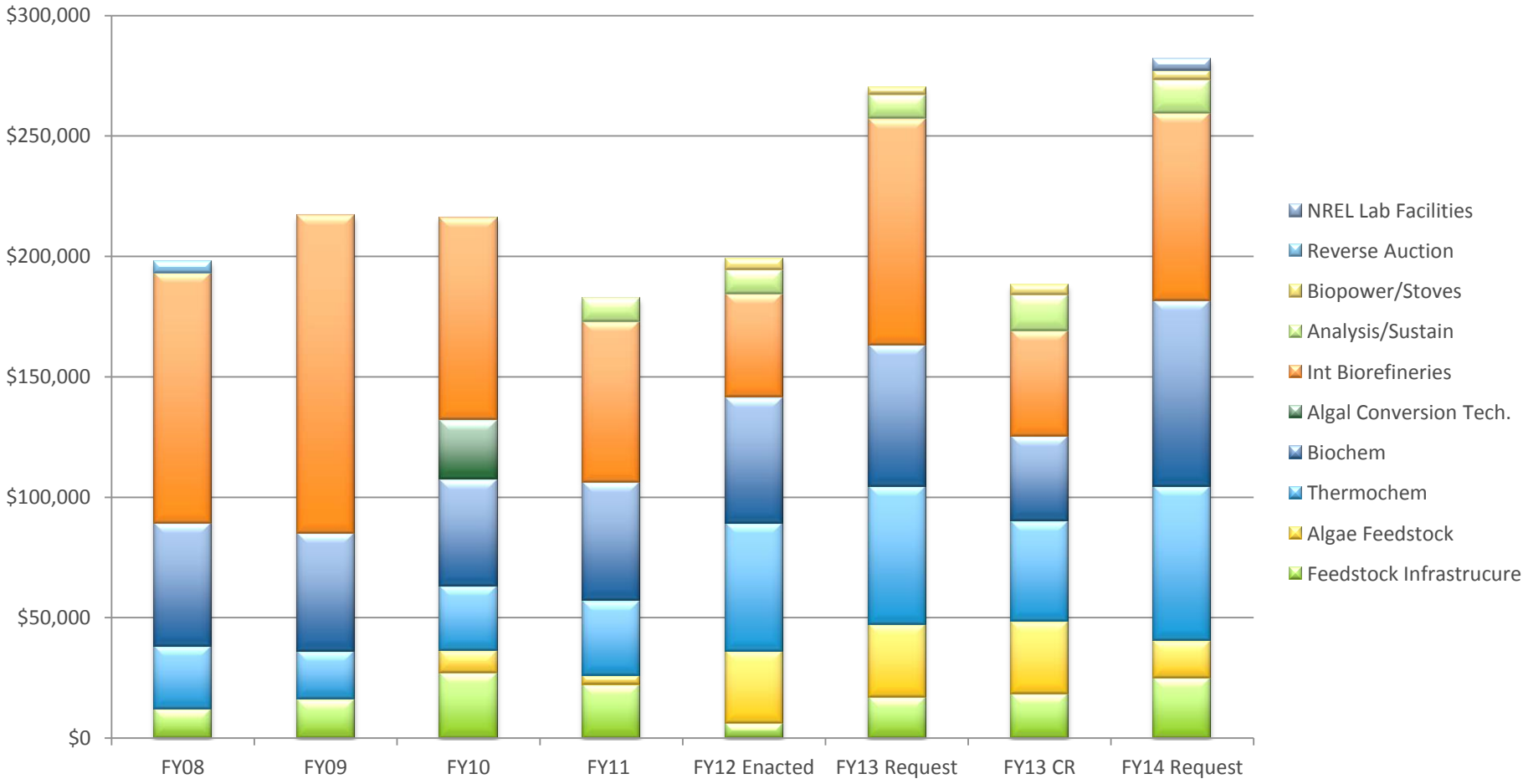
Elliott Levine

Department of Energy Updates

Bioenergy Technologies Office Budget

Annual Appropriations

- Average of $220M between FY08 - FY14



Recent Bioenergy Technologies Office Solicitations

Innovative Pilot and Demonstration Scale Production of Advanced Biofuels

- On April 22nd, the Department of Energy announced the four projects selected for negotiation for the innovative pilot FOA for the production of advanced biofuels. Each project that was selected will be working to produce biofuels that meet military specifications for jet and diesel fuel.

  — Frontline Bioenergy LLCM, Ames, Iowa

Up to $4.2 million to produce FT liquids from woody biomass, municipal solid waste, and refuse derived fuel. These liquids will be upgraded to produce samples of biofuels that meet military specifications.

— Cobalt Technologies, Mountain View, California

Up to $2.5 million to operate a pilot-scale integrated biorefinery to convert switchgrass to bio-jet fuel.

— Mercurius Biorefining, Inc., Ferndale, Washington

Up to $4.6 million to operate a pilot plant converting cellulosic biomass into drop-in bio-jet fuel and chemicals.

— BioProcess Algae, Shenandoah, Iowa

Up to $6.4 million to produce hydrocarbon fuels meeting military specifications from an algae-based integrated biorefinery.

An F/A-18 Green Hornet Fighter plane operating on a 50/50 biofuels blend. Photo courtesy of the U.S. Navy.

Bioenergy Technologies Office Solicitations

Carbon, Hydrogen and Separation Efficiencies in Bio-Oil Conversion Pathways (CHASE Bio-Oil Pathways)

On December 14th, 2012, BETO released a solicitation for up to $12 million to focus on three barriers repeatedly identified at CTAB and in the RFI:

- Carbon efficiency: developing selective fractionation and separation systems in bio-oil processing;
- Hydrogen efficiency: improving H2 production, use, and transfer in biomass liquefaction and bio-oil upgrading; and
- Separations efficiency: developing technologies for use and mitigation of the aqueous fraction of bio-oil.

The solicitation closed on February 20, 2013 and is in the final stages of the review process, expected to be announced in the Summer of 2013.

Bioenergy Technologies Office Solicitations

Advanced Biomass Feedstock Logistics Systems II

On January 28, 2013, this solicitation was released up to $6 million to support developing and demonstrating strategies, equipment, and rapid analytical methods to manage feedstock quality within economic constraints throughout the feedstock supply chain. The main effort must be directed toward full-scale demonstration of integrated feedstock supply chain systems that can deliver:

- Large volumes of high quality feedstocks
- At an affordable price
- Over long distances

The solicitation closed on March 22, 2013, and is currently under review. Awards are currently expected to be made later on in 2013.

Bioenergy Technologies Office Solicitations

Advancements in Algae Biofuel Yield (ABY)

On January 16, 2013, BETO released a solicitation for up to $10 million for the Advancements in Algal Biomass Yield, to demonstrate, at a process development unit scale of one acre cultivation equivalent, algal biofuel intermediate yield of 2,500 gallons of biofuel feedstock (or equivalent dry weight basis) per acre per year by 2018. This target is an important milestone in reducing the cost of algal biofuels to be cost-competitive. Research focuses on the following three main priority areas:

- Improvements in Algal Biomass Productivity;
- Improvements in Preprocessing Technologies; and
- Technical Advances that Enable Integration of Algal Biomass Unit Operations

The solicitation closed on April 1, 2013, and is currently under review. Awards are expected to be made later on in 2013.

Upcoming Bioenergy Technologies Office Solicitations

Waste to Energy Request for Information:

WASTE: Waste Applications for Sustainable Technologies for Energy

Opening: June 7th

- Seeking information on how to improve or overcome technical and economic barriers within Waste to Energy Operations through increase in productivity and efficiency of operations or through diversified outputs such as heat, power, fuel, or other high value by-products.
- Many types of waste water or effluents, including Biorefinery waste water, can be reduced or recycled and from it, energy can be generated. This RFI seeks to understand those pathways and their current status, including those research efforts seeking to improve them.
- This RFI is also interested in modular and community scale applications for waste to energy such as that currently in place within the dairy industry and seeks to discover other industrial sectors that could benefit from similar application.

Defense Production Act – Advanced Biofuels Initiative

- On May 24, 2013, the Defense Department awarded $16 million for three contracts as part of the Advanced Drop-In Biofuels Production Project, also known as the Defense Production Act Title III program.
  - Grants will be matched by $17 million in investments by the contractors.
- The initiative targeted domestic biorefineries capable of producing drop-in transportation biofuels intended for military operational use.
  - Biofuels produced at these facilities must meet military specifications for JP-5, JP-8, or F-76.
- The three projects selected for the phase 1 awards were:
  - Emerald Biofuels, LLC, Golf, Illinois
  - Natures BioReserve, LLC, Sioux City, Nebraska
  - Fulcrum Brighton Biofuels, LLC, Pleasanton, California

Peer Review

Bioenergy Technologies Office Project Peer Review

May 20-23, 2013 : Hilton Mark Center, Alexandria, VA

- Approximately 223 projects in 9 Technology Areas were reviewed in simultaneous review sessions. Projects reviewed represented $1.47 billion dollars of DOE funding, without cost share.
- Opening plenary sessions highlighted the overall strategic direction for the Office and cross-cutting focus areas.
- Information obtained from the Peer Review process will be compiled into a report, and will be used to improve the management and oversight of BETO projects and inform future funding allocations and other management decisions

Bioenergy Technologies Office Project Management Review

July 30, 2013 : Renaissance Hotel, Washington D.C.

- Results from the Project Peer Review will be highlighted and the overall focus and proposed future direction for the Office will be reviewed.
- The BETO Project Management Review will take place immediately before the start of Biomass 2013.

BIOMASS 2013:

HOW THE ADVANCED BIOINDUSTRY IS RESHAPING AMERICAN ENERGY

- July 31-August 1, Washington DC Convention Center
- This year's agenda will include a focus on celebrating successes, current trends and frontiers, as well as highlighting sustainability and Biorefinery projects.
- Consistent with new Office of Management and Budget (OMB) guidelines for all federal conferences, there will be a modest registration fee collected to offset logistical costs for this year's Biomass 2013 conference.
    - Student – $50.00
    - Federal Employee – $50.00
    - National Laboratory Staff – $100.00
    - General (by July 8th) – $100.00
    - General (after July 8th) – $150.00
- Information is available and will be continually updated on the BETO website.

Natural Gas-Biomass to Liquids Workshop – Overview (1/2)

When: September 3, 2013

11:00 AM – 5:00 PM *(tentative)*

Where: Sheraton Chicago Hotel & Towers

301 East North Water Street

Chicago, Illinois 60611

The workshop is being planned as a pre-conference event with tcbiomass2013, hosted by the Gas Technology Institute. tcbiomass2013 will begin with a welcome reception the evening of September 3, and last through September 6 and will be held in the same venue as the workshop.

Natural Gas-Biomass to Liquids Workshop – Objectives (2/2)

The objective of the GBTL Workshop is to obtain input from industry, academia, research establishments, and other experts on whether or not there is a role for the Department of Energy to conduct research and development and develop new process technologies.

Facilitated discussions with the participants will be broken out in two main tracks, Technical Barriers and LCA/Volume Resource Potential.

For more information on the GBTL Workshop, including registration information, please contact Ashley Rose, ashley.rose@ee.doe.gov

Renewable Low-Cost Carbon Fiber for Lightweight Vehicles Workshop

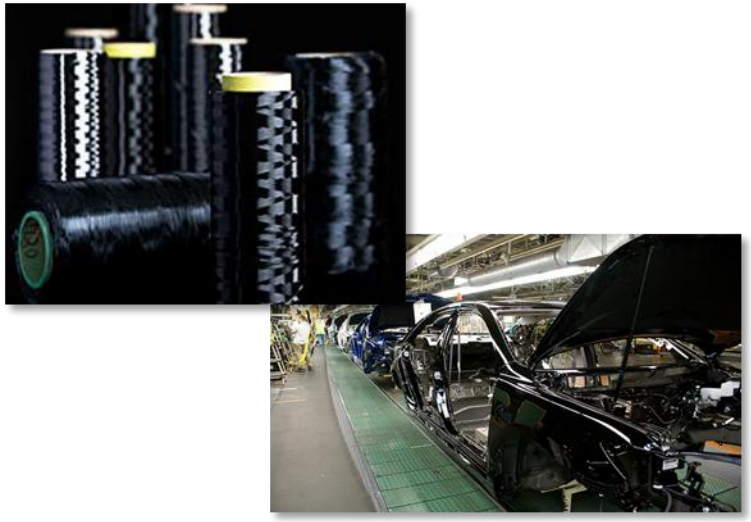
- The Department of Energy's Bioenergy Technologies Office, in coordination with the Advanced Manufacturing and Vehicle Technologies Offices, is hosting a workshop on the use of renewable, low-cost carbon fiber for lightweight vehicles. Issues discussed at this event will include the technical challenges of carbon fiber manufacturing, including meeting end product specifications for vehicle structural components; the technical challenges of converting biomass resources to "drop-in" carbon fiber intermediates; and the resources, challenges and opportunities in unconventional carbon fiber.

When: June 4-5, 2013

Where: Sheraton Detroit Metro Airport Hotel

8000 Merriman Road

Romulus, MI 48174



Biochemical Biorefining Study

On April 24, the Bioenergy Technologies Office announced that four national laboratory partners contributed to a joint study on biochemical biorefineries. “Investigation of biochemical biorefinery sizing and environmental sustainability impacts for conventional bale system and advanced uniform biomass logistics designs” examines issues around biorefinery capacity, life cycle assessment, sustainability, and reliable feedstock logistics.

Contributing Labs:

- Argonne National Lab
- Idaho National Lab
- National Renewable Energy Laboratory
- Oak Ridge National Laboratory

The study concluded that an advanced uniform design (AUD) to biomass feedstock supply—which involves ‘pre-processing’ the biomass into a higher-density, more stable, easily transportable format—would yield greater advantages over a conventional-bale system.

New Secretary of Energy

- President Obama named his new nominee for Secretary of Energy – Ernest J. Moniz.
- Senate energy committee approved nomination on April 18th, 2013.
- Full Senate hearing confirmed Moniz's nomination occurred on May 16th.

EERE Reorganization

RENEWABLE ELECTRICITY GENERATION

- Solar
- Geothermal
- Wind
- Water

ENERGY-SAVING HOMES, BUILDINGS, AND MANUFACTURING

- Buildings
- Manufacturing
- Government
- Weatherization and Intergovernmental

SUSTAINABLE TRANSPORTATION

- **Bioenergy**
- Hydrogen and Fuel Cells
- Vehicles

DOE-BER Update: June 2013

U.S. DEPARTMENT OF ENERGY
Office of Science

Program Activities:

Genomic Sciences Contractor-Grantee Meeting XI / USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Meeting 2013

February 24-27, 2013, North Bethesda MD

- Featured the **DOE Systems Biology Knowledgebase (KBase)** rollout!

Solicitations:

- **USDA-DOE Plant Feedstock Genomics for Bioenergy (DE-FOA -0000770)**
  - Interactions between bioenergy feedstocks and their environment; development of new cultivars of regionally-adapted bioenergy feedstocks
  - 54 full proposals received Feb.25, 2013; panel review held April 24-25; final decisions currently underway.

- **Genomic Science: Systems Biology Enabled Research on the Role of Microbial Communities in Carbon Cycling (DE-FOA-0000866)**
  - Regulatory, metabolic networks of microbes, consortia, and plant-microbe interactions involved in biogeochemical C cycling; 'omics approaches to community functional processes, imaging and analysis in terrestrial ecosystems
  - 67 full proposals received April 19, 2013; panel review to be held June 5-6.

U.S. DEPARTMENT OF ENERGY
Office of Science

Awards

DOE Office of Science Early Career Research Program

- 770 total proposals received, 61 selected for fiscal year 2013 (announced May 7, 2013), four recommended by BER-BSSD:

- 2 plant projects (Cellulase Expression in Populus; Synthetic Biology Tools to Engineer Plant Root Systems)
- 2 microbial projects (Engineering Anaerobic Gut Fungi for Lignocellulose Breakdown; Engineering mRNA Turnover in Cyanobacteria)

DOE Joint Genome Institute (JGI): Emerging Technologies Opportunities Program (ETOP)

- Develop and support selected new technologies that add value to high throughput sequencing through partnership with DOE Joint Genome Institute (JGI).

- Full proposals submitted February 27, 2013
- 6 new partnerships selected (including isolation of high quality genomic DNA from plants; accurate gene synthesis with tag-directed retrieval of sequence-verified DNA molecules)

Useful Links

Bioenergy Technologies Office Links:

1. BETO Multi-Year Program Plan, November 2012 Update
   http://www1.eere.energy.gov/biomass/pdfs/mypp_november_2012.pdf
2. Innovative Pilot Award Announcements
   http://energy.gov/articles/energy-department-announces-new-innovative-projects-develop-advanced-drop-biofuels-military
3. BETO Funding Opportunities
   http://www1.eere.energy.gov/biomass/biomass_solicitations.html
4. 2013 Peer Review
   http://www1.eere.energy.gov/biomass/peer_review2013.html
5. Biomass 2013
   http://www1.eere.energy.gov/biomass/biomass_2013.html
6. Carbon Fiber Workshop
   http://www1.eere.energy.gov/biomass/carbon_fiber_workshop.html
7. Natural Gas-Biomass to Liquids Workshop
   http://www1.eere.energy.gov/biomass/gbtl_workshop.html
8. Biochemical Biorefinery Study
   http://onlinelibrary.wiley.com/doi/10.1002/bbb.1391/full